

R&D / Conceptual Design Phase Cost and Schedule

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Costing Process and Assumptions



- LBNL and SSL labor rates are in FY01 dollars and escalated for FY02.
- Assumed comparable LBNL rates for contributed efforts (costed in U.S. dollars).
- Escalation rates for FY02:
 - 3.7% on LBNL salaries
 - 5% on SSL salaries
 - 0% on materials
- Scientist salaries are typically off-project. (except Post Docs, Grad Students...)
- Estimate is fully overheaded utilizing the appropriate burden and overhead treatments.

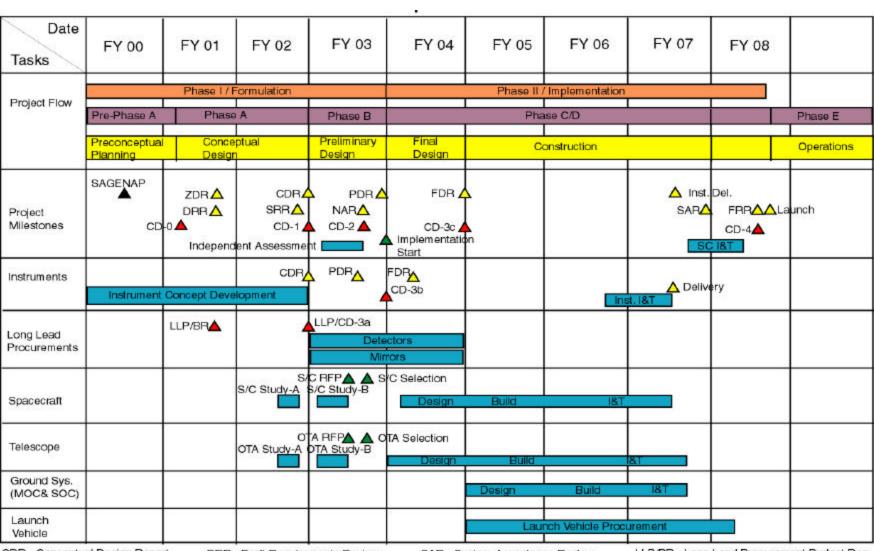
SE & PM



- Systems Engineering (SE) "the glue" Sr. Technical People
 - Requirements understanding and capturing what's really required in order to meet scientific objectives
 - Systems Analysis understanding and modeling the performance and cost of the various instruments/components and options
 - Trades optimizing the performance and cost of the elements AND the system as a whole to meet the key scientific objectives
 - **Integration and Interfaces** negotiate the rough spots, maintain a "big picture" perspective, make sure people know what's going on around them
 - Industry Contracts Aerospace and Optics contracts budget
- Project Management (PM) "the decision makers"
 - Project Manager and Project Engineer technical, financial and schedule management
 - Cost and Schedule Development planning, integration, roll-ups and budgeting for reviewable presentation and understanding
 - **Management Reserve** contingency to cover the unknowns; what are we going to need next year that we don't know about today?

SNAP Top-Level Schedule



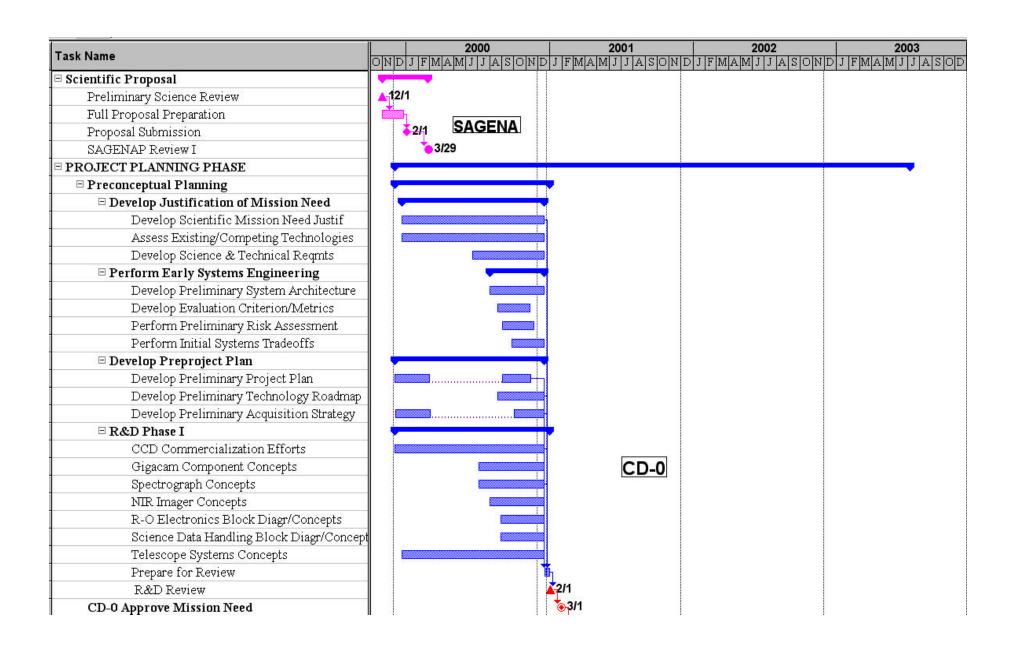


CDR - Conceptual Design Report FDR - Final/Critical Design Review FRR - Flight Readiness Review DRR - Draft Requirements Review NAR - Non-Advocate Review PDR - Preliminary Design Review

SAR - System Acceptance Review SRR - Systems Requirement Review ZDR - Zeroth Order Design Report LLP/BR - Long Lead Procurement Budget Reg.

SNAP Integrated Sched. for R&D/Phase A





Integrated Schedule Con't



sk Name	2000 	2001	2002 DJFMAMJJASOND	2003
□ Conceptual Design Phase	MINIS IS IMMENDED IN TO IN IN	2 EMMEM2 2 VISION I	SISTEM MAINTS STATE SOLVED	
□ R&D Phase II				
☐ CCD Commercialization				
LBNL CCD Lab Run				
Commercial 6" line Engineering Run				
Functional Tests II at LBNL		<u> </u>		
Commercial Pre-Production Run				
Functional Tests at LBNL				
☐ Gigacam Component Prototyping			 	
CCD Mount Prototypes I - III				
Backer 3x3 Prototypes				
Thermal/Structural Testing				
□ R-O Electronics Prototyping				
Analog & Digital IC Prototypes				
Prototype Testing			<u></u>	
Flex Cable Prototypes		Analo Analog & Di	igital Digital	
☐ Gigacam System Prototyping 4x4 Optical Imager Prototype Build	Turning Turnin		T	
4x4 Optical imager Prototype Build 4x4 Prototype Test				
Science Data Mgm't System Development				
NIR Imager Development & Prototypes				
Spectrograph Development & Prototypes				
Telescope System Development				
□ Conceptual Design				
□ Early Conceptual Design				
Continue Systems Trade-Studies				
Refine Technical Requirements				
Initial Conceptual Dsgn of Instruments				
Initial Conceptual Dsgn of OTA				
Prepare Preliminary Proj. Execution Plan (PEI				
Revise Risk Assessment				
Prepare for Techn. Status Review		<u> </u>		
DOE Technical Status Review		₹9/12		
□ Instrument Conceptual Design			<u> </u>	
Gigacam Conceptual Dsgn				
NIR Imager Conceptual Design				
Spectrograph Conceptual Design				
OTA Conceptual Design				
A CONTROL OF THE CONT				
Spacecraft Conceptual Design/Rqmt's			<u> </u>	
Revise Project Exectution Plan				
Prepare Conceptual Design Report (CDR)			To the second se	
Submit Formal CDR			↑ CDR /	
Develop Risk Management Plan				
Develop Cost Range & Project Schedule				
Prepare for CD-1 Technical review			1	
Lehman CDR/CD-1 Review			₹9/20	

Integrated Schedule Con't



Task Name	NIE	2000	2001 J F M A M J J A S O N D	2002 JFMAMJJASOND	2003 J F M A M J J A ;	SIOINIE
Develop Risk Management Plan	MD					PIOINIT
Develop Cost Range & Project Schedule	5					
Prepare for CD-1 Technical review	1			<u> </u>		
Lehman CDR/CD-1 Review	1			¥9/20		
CD-1 Approve Preliminary Baseline Range	1			⊕ 10/1		
□ PROJECT EXECUTION PHASE	3					
□ Preliminary Design (Title I)	1					
☐ Instrumentation Systems Preliminary Design	1					
Gigacam System Preliminary Design	1					
NIR Imager & Spectro. System Prelim Dsgn						
Telescope Systems Preliminary Design						
Spacecraft Preliminary Requirements						
Launch Vehicle Preliminary Requirements	1					
Integration, Test & Operations Plan						
Project Preliminary Design Review (PDR)	1				₹ 718	
☐ Establish DOE Project Baseline	1					TIT
Contractor Project Management System Established	1					
Final Project Execution Plan & Perf. Baseline						
Independent Cost Estimate Development						
NEPA & PDS Preparation & Procedure	1					
Preliminary Safety Analysis Report	1					
Verification of Mission Need by Independent Review						
Submit All Baseline Documents					₹7/ 8	
Prepare for CD-2 T/C/S Review	1				Ť.	Î.
Lehman CD-2 Review					7	9/2
CD-2 Approve Baseline Performance						<u></u> ⑤ 1 1 1 1 1 1 1 1 1 1
⊕ Final Design (Title II)						1
Maintain DOE Project Baseline						+
CD-3 Approve Start of Construction						
Track the Formation of Budget Authority						
Construction (Title III)						
Launch Window						
CD-4 Approve Start of Operations						
∃ MISSION						
Operations						

Milestones & Tie Points



No.	Milestone:	Date:
1	R-O Electronics Requirements document (draft 0)	Mar-01
2	NIR camera selection	Jul-01
3	HgCdTe Technology Decision	Jul-01
4	FIDO vs Separate Instruments Decision	Jul-01
5	NIRcam Requirements document (draft 0)	Jul-01
6	Spectrograph requirements document (draft 0)	Jul-01
7	** Zeroth Order Design Report (PM)	Jul-01
8	** Draft Requirments Review	Jul-01
9	Long lead procurement/budget request (PM)	Jul-01
10	Telemetry/Compression Decision	Aug-01
11	Warm vs Cold Optics Decision	Sep-01

- Key decision impacting multiple subsystems
- ZDR preparation Draft Requirements Review
- CDR preparation System Requirements Review
- Gigacam Prototype System Test

Milestones & Tie Points Cont.



No.	Milestone:	Date:
12	Gigacam Devel. CCD Com. Run 4 - System Test	Jun-02
13	Preliminary I&T plan (SE)	Jul-02
14	Gigacam Mech Prototype HW Compl System Test	Sep-02
15	Instrument Calibration Requirements Determined	Sep-02
16	DAQ Requirements document	Sep-02
17	** Conceptual Design Report/Review (PM)	Sep-02
18	** System Requirements Review (PM)	Sep-02
19	Software requirements document	Oct-02
20	OTA RFP document distributed (in Phase B)	Apr-03
21	Gigacam R-O Electr. Prototype HW Avail System Test	Jun-03
22	** Gigacam Prototype System Test (start)	Jun-03

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